

(12) UK Patent Application (19) GB (11) 2 331 241 (13) A**(43) Date of A Publication 19.05.1999****(21) Application No 9723764.8****(22) Date of Filing 12.11.1997****(71) Applicant(s)****Michael Pochin Marius Wright
47 Six Hills Road, LOUGHBOROUGH, Leicestershire,
LE12 8JS, United Kingdom****Geoffrey Reason Woodford
The Nest, School Lane, SKEYTON, Norfolk, NR10 5BA,
United Kingdom****(72) Inventor(s)****Michael Pochin Marius Wright
Geoffrey Reason Woodford****(74) Agent and/or Address for Service****Geoffrey Reason Woodford
The Nest, School Lane, SKEYTON, Norfolk, NR10 5BA,
United Kingdom****(51) INT CL⁶****F42D 5/045, A62C 2/06****(52) UK CL (Edition Q)****A5A A37****(56) Documents Cited****None****(58) Field of Search****NO SEARCH PERFORMED: SECTION 17(5)(B)****(54) Abstract Title****Antiblast or anti-detonation system**

(57) A fully portable anti-blast system comprises anti ballistic woven matting that when folded and suitably secured into its fold forms an envelope into which a bag capable of retaining one tonne of water when filled, is inserted.

GB 2 331 241 A

IMPROVED APPARATUS AND METHOD FOR AN IMPACT ANTI-DETONATION
OR BLAST VARIABLE FULLY PORTABLE SYSTEM

Field of the invention

The present invention relates to apparatus for, and method
of, mitigating a force of blast or explosion or detonation
whereby the apparatus can be rapidly deployed and employed
to a pre-determined position in the minimum of time. The
apparatus also being so designed to contain, and deflect
fragments and particle to identify the signature of the
offender's and their source.

Background to the invention

Through Provincial and International media coverage most
people are aware of the havoc, devastation and consequential
losses caused by series of events that form a number of
headings such as terrorism, provincial bombers, un-exploded
bomb and the like where objects designed to cause disruption,
maiming and the like are decidedly placed in selected areas
to obtain optimum effect to the cause of whomever planted
the device or object. Typically, a prior warning is given
indicating a proximity of a device, or object that has been
planted or positioned in such a way as to cause the required
mass disruption. Equally people are aware of un-exploded
bombs that are recent or past relics of conflict, people are
aware of gas leaks and the like, they act in an orderly
fashion when advised of a course of evacuation. However,
the radical element that is now International and their
capability cause abstract fear, as the public have no

knowledge of the intended capacity of the threat capability.
that is part and parcel of the terrorist's arsenal.

In most cases the area is cleared for the safety of those
in the proximity of potential threat, but, in a resulting
5 detonation, controlled or otherwise, there is no mitigating
factor suitably employed at present, nor means of collecting
forensics rapidly to obtain a signature of the device. This
therefore is the background of the invention, arriving at,
whereby a man portable anti-blast system, can, singularly
10 if needs be, be emplaced over a suspect or known device or
object thought to be, or known to be, a form of an explosive
or harmful substance.

Substantially, the subject of this invention, but in a form
of mass capability to mitigate a suspect vehicle has been
15 addressed by Woodford and Wright GB 961576.5. This invention
however is created to offset and diminish soft targets where
the use of small devices and compact explosives and the like
are placed in areas prominent with public passage, public
in general, shops, stores, major complexes, governmental and
20 establishments to do with a Realm. The invention can be
readily employed if carried or adopted by aircraft, shipping,
port and harbour, Intelligence community etc and those
employed in rapid response, in particular, law and order.
25 Reports, in particular emerging from Manhattan and Oklahoma
have made public the thousands of man hours spent gathering
forensic matter to arrive at a conclusion for prosecution.
The events of Canary Wharf and Manchester combined with
the United States atrocities are prime movers in arriving
at this invention.

Summary of the invention

According to a first aspect of the present invention there is provided a woven matting to a prescribed warp and weft count of typically 1580 D Tex Aramid-Kevlar TM yarns as used in ballistic apparel protection. The yarn has therefore pure scientific recognition Internationally. The yarns are woven by a factory in The United Kingdom who are DEFCON standard to form a specific warp and weft count that formulates density that in its linear state and when subjected to extremes of force and magnitude, compatible to specific terrorists preferred detonators and explosives, the woven matting is so proven as to not only mitigate the effects of an explosion, but also to retain in its fibres, fragmentation, particle and residue of the explosion in a form referred to as signature.

According to the second aspect of the invention is a bag of required substance and flexibility, that when coupled to a hosing, shall fill very rapidly with, and retain, water to a substantial and predetermined volume.

The system is capable of enlargement and reduction to counter many factors. The system is capable of accepting introduced chemicals to enhance forensics or alternative objectives that are sought. The system can adopt accelerants to introduce forms of foaming within the water bag or other materials that aid an objective. The additives of chemicals that enhance reduction of combustion, flame, flash and blow back can be introduced into the bag in liquid, crystal or powder form prior to deployment, or introduced at the point of prior coupling the male to female hosings, the introduced formula

achieving its objective by say, inserting a cartridge or container or tablet or crystal or powder into the connecting water input point, whereby, upon coupling, and water commence to flow, the water pressure propels the chemical in whatever form, into the water bag, wherein the chemical pre designed, in itself, activates.

The water bag has two filling points in the version hereby typified as the version herein described is designed for one specific target, being the smaller devices used against soft targets. Thereby only two filling points are referred to. Clearly a plurality of filling points could be added for any other version, be it larger or indeed smaller, in the same way that increased inlet outlet valves, drainage outlets, warning indicators and other sophisticated devices can apply.

The soft target is typically where pedestrians are, but as we are all aware so are dense areas of business, communications, infrastructure, also in motorway junctions, their flyovers, railway signalling points, rail junction points, rails themselves, airports, shipping, channel tunnels, Eurostar, fuel depots, and a list of opportunity for the terrorist to disrupt that is endless. The terrorists prime explosive is based on RDX to which the apparatus is directed against.

The present invention principally of two parts when married together, form a mitigating factor, in that the water bag is inserted between two faces of matting. The matting forming a top and bottom in exactly the manner in which a pillow is placed inside a pillow case, the pillow case thereby forming the top and bottom, protecting the pillow within the pillow-

case. Similarly the water bag is protected. The bottom matting can be singular as shall be described, or it could be doubled or to any number of thicknesses as could the top mat.

5 The water bag in itself, has two filling points, typically if the system were solely employed in The United Kingdom, fittings to adopt water ingress would be standard fittings to British Standard. However, as the system shall be employed widely overseas and in ships, aircraft, trains, vehicles and the like, the hosing's for water access are also offered as
10 conical, in that they may be cut at the appropriate point to fit into/onto any size of hosing anywhere in The World how ever employed, the hosing's adopted couplings affixed by a Jubilee TM type clip, coupling, then to water source can commence, for trials/training, and subsequent Theatre use.

15 Quality of water has no effect on the apparatus, the water can be fresh, saline or salt.

The water bag has two filling points, one Aft, one Port. As stated, the bag can have a plurality of any of its components to make it larger, smaller, values increased, decreased etc.
20 The bag has also drainage point, inlet outlet valve to release trapped air, and a visual gauge of filling status, the gauge is not fundamental in performance, it is a guide to status of filling at a given adoption of water stage and the guide is activated by a combination of water ingress and semi
25 trapped air, air, that at the same time is being vented by the inlet outlet valve. The water bag is sandwiched between two layers of matting constructed from ballistic tested yarns and so woven to provide extraordinary strength under pressure

fundamentally caused by an explosion to which the apparatus is addressed to mitigate.

5 The common scenario; Mainland bombings are notified of intent by coded warnings giving proximity of the device or devices that may be placed in any number of locations, at distance apart, so as to stretch the resources of law and order who can deal with the problem. The invention herein described is formulated to assist dealing with such a problem nationally.

10 The system termed 'BLOWK' is fully individual portable. The BLOWK system is anticipated to be situated at a prime centre store in a high street or Mall. Any store that has a suspect device can call that centre point, the BLOWK is carried to the store in question and placed over the target object. The area is people cleared, authorities notified exact position.

15 Person 'in store' who has been trained, together with others who have been trained would immediately, (whilst at the same time emergency services notified) remove coupling cap, couple up the BLOWK to the stores fire fighting hose (using two hoses if in proximity) whereby the hose coupled, water on, the bag

20 would fill inside 5 minutes, initially providing a skirt of water contained in the bag around the object and rising up the objective, whereby a phallic nozzle (as in narrow balloon) rises caused by water to trapped air, the water can then be turned off. The water bag at that point would contain in the

25 region of one tonne of water and contained fully by its own ballistic protection. Anti tamper devices should not be activated, as the object is not touched, as in lifting of for the BLOWK is laid over 'gently'. Water then turned on, flow

provides dual but progressing equal pressure around the targets base. The skirt forms in a copious volume dead weight.

The BLOWK has been tested with classified materials to a point in excess of anticipation for a small device. The explosion immediately releases one tonne of water, not only saturating but also ingress to fibres, as the explosion, now denied its degree of oxygen progresses into secondary, the skirt, albeit per mil of a second, retains values of water, albeit multiple fractured, thus impeding and confusing the explosions line of progression with fragmentation, particles and signature being adopted by the two mass walls of BLOWK as the mats are then coursed to rise by the detonations resulting matter and gasses force. The BLOWK succeeds in the reduction of force, reduction of collateral damage, reduction of glass splinter and ensuing reduction of blast pressure. Had Police arrived on the scene first, they would have adopted similar procedure, as task vehicles are projected to carry a BLOWK in their vehicle boot in major cities Mainland UK. Fire Service, if the device were on ground floor, would have dual connected to appliance with Bomb Disposal notified. Should the target be made safe, The Fire Service would drain the BLOWK by uncoupling their hose external to the store. In the event of target made safe, the BLOWK is emptied and placed back in its central storage position. If BLOWK has been subjected to blast/detonation, even to magnitude of destruction, its shall retain entwined in fibre/strand/fragment or pieces or substantial mat, signature of the device and explosive used, notwithstanding fragments or substantial parts of the device's original container, and other forensic matter, aiding identity of signature...

Brief description of drawings

The invention will now be described in more detail, by way of example only, with reference to the accompanying drawings in which the Figures show plan and sectional view of the various assemblies.

Description of the preferred embodiments

For the sake of clarity, the terms bag and mat used throughout this specification are intended to describe various aspects of the apparatus as a whole. The term BLOKE is the

given terminology by which this apparatus shall become known and the position of fixings to the bag may be altered to any configuration. The drawings are not to any exact scale;

Figure 1 shows plan of The BLOKE matting woven from yarns of ballistic performance, attached by flag stitching 12 are ties

13. The mat Figure 1 is folded over 11 by approximately 50% of its woven length as illustrated Figure 2 and the water bag

Figure 3 is slid into position within the folded matting

Figure 2. With the water bag Figure 3 inside the matting as illustrated in Figure 4 the hoses Port and Aft or Port and

Starboard or both on the same side are laid outward from their welded position 15, the ties 13 secured by flag stitching 12

are then tied together 16 and bar tacking lockstitch positions as shown in Figure 1 by the number 14 whereby in Figure 1 six

bar tack lockstitch positions 14 are shown on top selvedge, six

bar tack lockstitch positions on the bottom selvedge 14, it is illustrated in Figure 5 that the top and bottom of the matting

are joined at three positions 17. The water bag Figure 3 is now enveloped within the matting Figure 1 and secured in by its

fold 11, the

ties 16 and three points either side of the folded matting by bar tacks 17.

Drawing No 2 illustrates Figure 6 being plan view of the water bag 3 the waterbag can be of a thickness as low as 30 micron

5 to thicknes's of up to 400 micron subject to its scale in need

In this instance the thickness of the water bag casing is of considerably less thickness than 400 micron as this BLOWK

design, size and shape is constructed to be fully portable,

by two persons, or if needs be, singular person. The BLOWK can

10 be to any shape or size or thickness, in this instance the

BLOKE is portrayed as three metre square in its finished size

and its depth can be at the selvedge 23 of nominal centimetres

in height up to larger proportions of a metre. The selvedge

23 can also be welded flat by joining top to bottom 10 and

15 flat welding 10 as opposed to applying walls 23 for expansion.

Figure 5 therefore illustrates waterbag Figure 3 with walls

welded 23 and additional flat weld 10. Hose pipes of fully

flexible weldable material up to 400 micron thick are welded

in two positions to the water bag 15 and the hose ends are

20 at their chosen length fitted with female standard hose

couplings 18 at users instruction or tapered 19 to accept any

size coupling that will be affixed by Jubilee TM clip or

similar. The water bag has an inlet outlet valve 21 to release

trapped air, a drainage outlet 20 and visual filling stage

25 phallic style gauge 22 of status of water contained, this is

activated by the pressure of trapped air venting via inlet

outlet valve 21.

Drawing 3 illustrates Figure 7 where a suspect device 24

commences to be covered by water contained by the water bag 3

the water therein supplied under pressure through connected hose/hoses 15 commencing to fill, causing the phallic indicator 22 activated by trapped air to intimate fifty percent fullness. The BLOKE apparatus combined matting 25 is substantially held in its position by its matting fold 11, bar tacking's 14, tie downs 16 and water 26. Volume of water 26 at half full stage is approximately half ton, having filled thus far in under four minutes.

Figure 8 illustrates BLOWK apparatus 25 at fullness of water 26 whereby phallic gauge 22 is ten degrees off vertical indicating termination of water 26 by hosing's 15 as trapped air 27 is in course of venting through inlet outlet valve 21. The BLOWK mat substantially held by its fold 11, bar tacks 14 and tie downs 16 do not yield to the pressure of water 26 and trapped air 27 for the stitching is constructed from ballistic tested yarns. The suspect device 24 potentially containing a detonator to RDX is fully contained by the BLOWK's top and bottom matting 25 and copious water 26 to the volume of one tonne.

Resulting capability of BLOWK has been described in prior text, However, should the suspect device be false alarm, drainage is by hosing couplings 18 as illustrated Figure six 18 or by drain aperture 20.

Figures 1,2,3,4,5,6,7 and 8 the sections therein are shown as square. However this is not essential and any suitable cross section configuration can be used subject to the potential threat targets that can be litter bin or smaller, to say a matchbox, in a confined airborne space, up to, substantial size as may be required to contain for example a controlled demolition of a construction to mitigate blast and fragment.

CLAIMS

5 The system is constructed principally of two components of which one is a matting, entirely woven from yarns that are to a specific weave and density to its warp and weft. Entirely
flag stitched from the same yarns whereby optimum strength is obtained. And bar tacked and lock stitched critically at, and to, areas designed to expand under pressure of magnitude in order to bellows.

10 With such density created from yarns Internationally recognised in the field of ballistic protection, the yarns then applied to the specific formation of weaving to arrive at the matting. Said matting being capable of accepting a blast of magnitude and on receiving said blast, the woven construction in its combination of weft to warp counts subject to and irrespective
15 of blast magnitude, shall contain in its fibres of warp and weft, however they be fragmented, representative samples of the factor of detonation, its particle, residue, fragment, the foregoing referred to as 'signature'.

20 Combining the water bag, capable of one tonne of water, as prior detailed, shall with its duplicity of matting, together in the event of an explosion on which the BLOKE is sited and filled with water, shall mitigate the explosion by suppression causing gasses denied oxygen to not follow predetermined course by said suppression, and release of said water equating to some
25 one tonne in deluge on the cause of explosion, thereby offering deferment of fractions in time. The matting in such fractions of time adopting particle of water aiding the objective of singature, at the same time mitigation of blast, and claim;

1. The system is so designed in principle to be apportioned to any size to mitigate an explosion under circumstances of potential terrorism to property on land, sea or in the air.

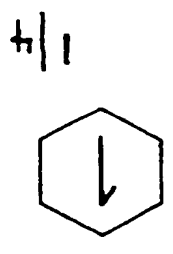
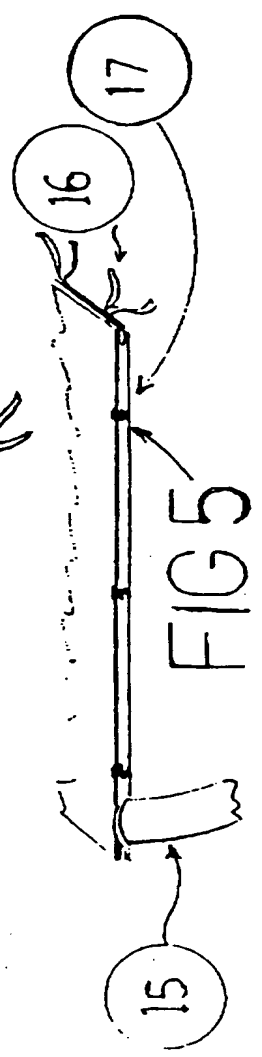
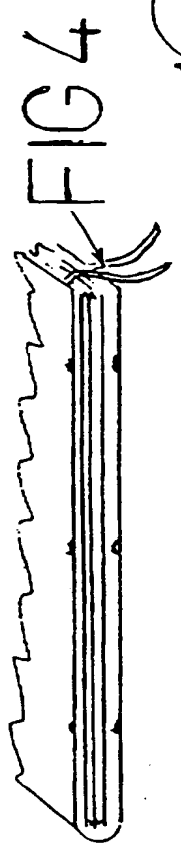
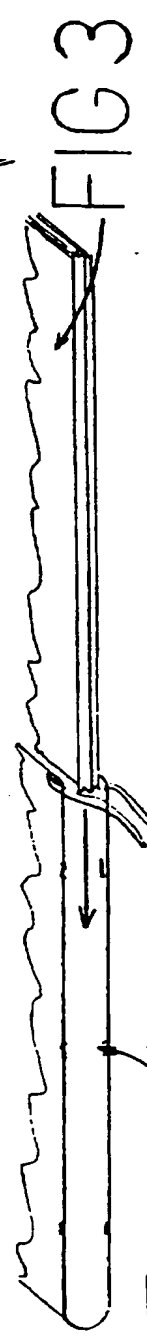
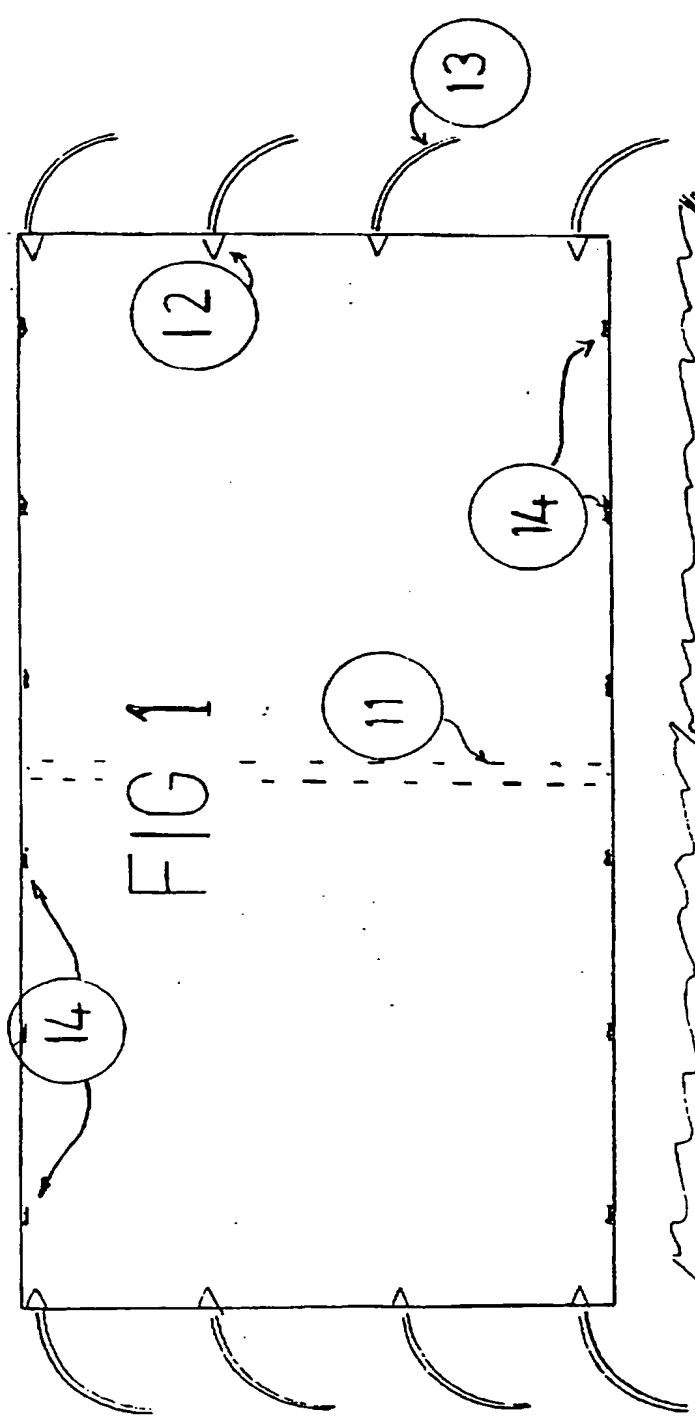
5 (i) The system is so designed for most rapid deployment in its prefabricated of sectional form to meet emergencies not linked with terrorism, such as gas, oil, volatile substance and the like that pose threat to well being.

10 (ii) The system is most suitable for the like of UXB's (bomb disposal), as degree of containment shall reduce the effect of consequent blast if detonation is option chosen due the instability of a device or plurality of same.

15 (iii) The device to a size deemed suitable can be carried on aircraft or shipping to deal with a potential hazard, the filling of the BLOWK being induced by water, water that is saline or salt water, added thereto can be chemicals, in tablet, crystal, powder or liquid form deemed advantageous agents. Air singularly or together with a chemical, water or any suitable liquid advantageous to mitigate circumstances.

20 2. The BLOWK apparatus is fully portable. Described has been the scenario of High Street bombing scare. The system can be so designed to be accommodated in a vehicle boot (trunk) for the officers of law and order to implement BLOWK on need basis. The BLOWK system should be located in Fire Service Headquarters, on Fire Service vehicles as so it should be
25 deployed to military and civil defence assets, airports, seaports, Channel Tunnel, Eurostar, areas perceived as a possible target, thereby emplacing emergency protection.

3. Favour terrorist's soft targets and litter bins, cycles be they pedal power or propelled with accompanying panier's for concealment of devices. BLOWK's can be so designed to meet the requirements to adequately cover.
- 5 4. Vehicles and the like are covered to some extent Woodford/Wright UK 9615756.5 under Patent Rules 1995 that is cited herein as prior art. Recent testing shall improve that configuration.
- 10 5. The BLOWK system can be employed/deployed with a plurality of matting positioned top and bottom, top or bottom, either sides as a further enabling factor to deflect or reduce the consequences of significant blast.
- 15 6. The water bags can be so constructed as to one bag inside the other produced from weldable, heat sealing, waterproof formulated by adhesive methods thereby producing a double skinned or plurality of skin and liner bag of any singular or combined thickness from 30 to 400 micron.
- 20 7. The BLOWK due its construction and plurality of filling points and drainage points can act as a water or liquid container. Liquid can relate to dangerous, volatile, Fuel or other substance.
8. Lifting points can be affixed as required as can any harness arrangement to enable mechanical or manual lifting of BLOWK and can be so arranged for airborne positioning.
- 25 9. Modifications can be applied for vertical/angular facing with a plurality of longitudinal containers so arranged.



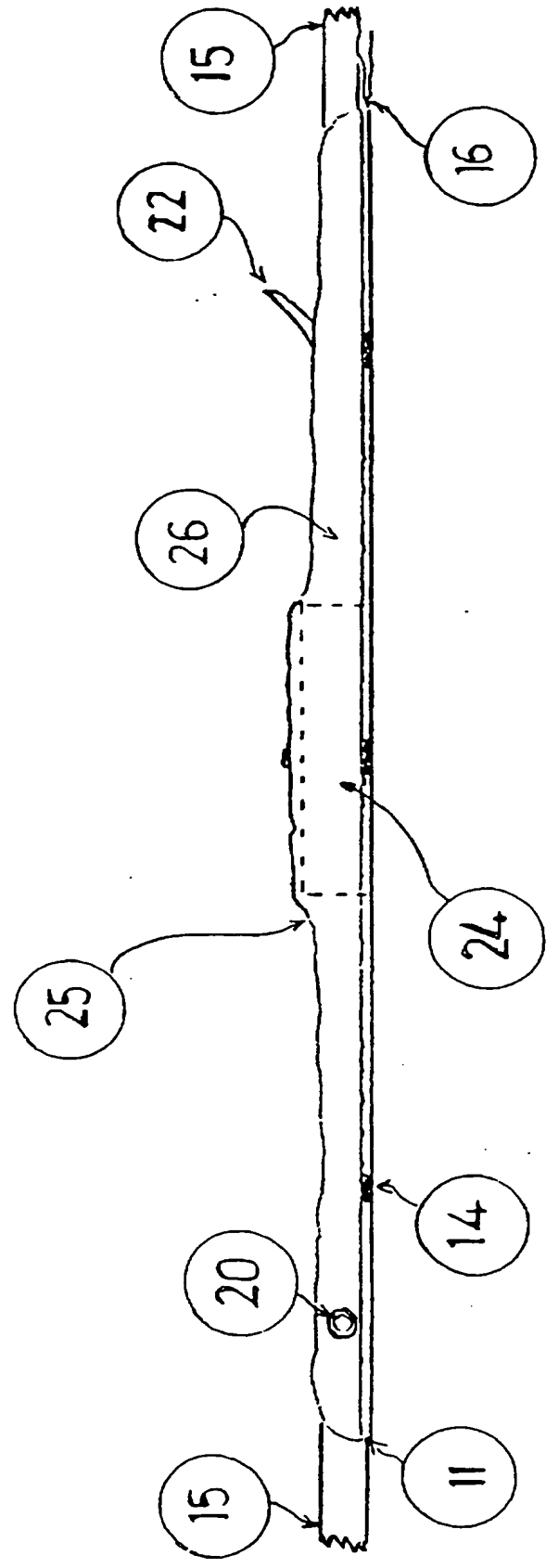


FIG 7

